

R E M A R K S

Reconsideration of this application, as amended, is respectfully requested.

THE SPECIFICATION

The specification has been amended to correct the minor informality pointed out by the Examiner. No new matter has been added, and it is respectfully requested that the amendment to the specification be approved and entered, and that the objection to the specification be withdrawn.

THE CLAIMS

Claims 1, 22 and 24 have been amended to clarify the feature of the present invention whereby the micro flow path has an end opening, and to recite a wire connected to the thin film heater through the end opening of the flow path and a sealant which seals the end opening of the flow path. See, for example, wire 18 and sealant 23 in Fig. 5.

In addition, claims 4 and 5 have been amended to depend from claim 3, and claims 1, 2, 4-12, 14-18, 22 and 24-27 have also been amended to make some minor grammatical improvements and to correct some minor antecedent basis problems so as to put them in better form for issuance in a U.S. patent.

Independent claims 28 and 29, moreover, have been prepared based on claims 1 and 24, but avoid some of the unnecessary limitations of claims 1 and 24.

Independent claims 30 and 35, moreover, have been prepared based on claims 28 and 29, but recite a heat insulating wall through which the wire penetrates, and do not recite a sealant (which is recited in claims 31 and 36 depending from claims 30 and 35). See, for example, Figs. 5 and 6 and the disclosure in the specification at, for example, page 12, line 10 to page 13, line 3.

Claims 32-34 and 37-39, moreover, have been prepared based on the disclosure in the specification at, for example, page 12, line 10 to page 13, line 3.

No new matter has been added, and it is respectfully requested that the amendments to claims 1, 2, 4-12, 14-18, 22 and 24-27 and the addition of claims 28-39 be approved and entered.

CLAIM FEE

The application was originally filed with 27 claims of which 3 were independent, and the appropriate claim fee was paid for such claims. The application now contains 39 claims, of which 7 are independent. Accordingly, a claim fee in the amount of \$1400 for the addition of 4 extra independent claims and 12 extra claims in total is attached hereto. In addition,

authorization is hereby given to charge any additional fees which may be determined to be required to Account No. 06-1378.

THE OBVIOUSNESS-TYPE DOUBLE PATENTING REJECTION

Claims 1-27 were rejected under the doctrine of obviousness-type double patenting as not being patentably distinct from claims 1-23 of copending application Serial No. 10/628,924, and claims 1-27 were also rejected under the doctrine of obviousness-type double patenting as not being patentably distinct from claims 1-27 of copending application Serial No. 10/479,009.

Each of amended independent claims 1, 22 and 24 recites a wire connected to the thin film heater through an end opening of the micro flow path, and a sealant which seals the end opening of the flow path.

It is respectfully submitted that the claims of Serial No. 10/628,924 and the claims of Serial No. 10/479,009 do not recite or suggest an end opening of a micro flow path through which a wire is connected to a thin film heater in the flow path, and a sealant which seals the end opening of the micro flow path, as recited in amended independent claims 1, 22 and 24.

Accordingly, it is respectfully submitted that claims 1-27 of the present application, as amended, are clearly patentably distinguishable from the claims of Serial No. 10/628,924 and the claims of Serial No. 10/479,009, and it is respectfully requested

that the obviousness-type double patenting rejection be withdrawn.

It is respectfully submitted, moreover, that the claims of Serial No. 10/628,924 and the claims of Serial No. 10/479,009 also do not recite or fairly suggest the features of the present invention as recited in new claims 28-39.

Accordingly, it is respectfully submitted that all of pending claims 1-39 of the present application clearly patentably distinguish over the claims of Serial No. 10/628,924 and the claims of Serial No. 10/479,009.

THE PRIOR ART REJECTION

Claims 1-27 were rejected under 35 USC 102 as being anticipated by both US 2002/0094462 ("Shioya et al") and US 2003/0138685 ("Jankowski et al"), and claims 1-23 were rejected under 35 USC 102 as being anticipated by USP 6,786,716 ("Gardner et al"). These rejections, however, are respectfully traversed with respect to the claims as amended hereinabove.

According to the present invention as recited in each of amended independent claims 1, 22 and 24, a micro flow path (which is defined between first and second substrates) has an end opening, and a thin film heater is provided in the flow path. In addition, according to the present invention as recited in amended independent claims 1, 22 and 24, a wire is connected to

the thin film heater through the end opening of the flow path, and a sealant seals the end opening of the flow path. See, for example, Fig. 5 of the present application, which shows a wire 18 connected to the thin film heater 17 and a sealant 23 that seals an opening in the micro flow path through which the wire 18 is provided. With this structure, even when the end of the micro flow path is opened to allow a wire to be connected to the thin film heater in the compact chemical reactor, fluid is prevented from leaking from the end opening of the micro flow path by the sealant.

It is respectfully submitted that these features of the present invention as recited in amended independent claims 1, 22 and 24 are not at all disclosed, taught or suggested in the cited references.

In particular, it is respectfully pointed out that Shioya et al discloses a thin-film heater 166 provided opposite to a reforming reaction flow path 164 with respect to a small substrate 161. That is, according to Shioya et al, the thin-film heater 166 is provided on the opposite side of the substrate 161 as the reforming reaction flow path 164. See paragraph [0259] and Fig. 35A of Shioya et al. Shioya et al also discloses a hydrogen gas exhaust portion 165 provided at an end portion of the reforming reaction flow path 164. However, Shioya et al does not disclose, teach or suggest a wire connected to the thin film

heater through an end opening of the micro flow path or a sealant which seals the end opening of the micro flow path, as according to the present invention as recited in each of amended independent claims 1, 22 and 24.

As recognized by the Examiner, Jankowski et al discloses a resistive heater. See, for example, paragraphs [0029] and [0030] of Jankowski et al. And as recognized by the Examiner, Gardner et al discloses a resistive heating element 160. It is respectfully submitted, however, that neither Jankowski et al nor Gardner et al discloses, teaches or suggests the structural features of the present invention whereby a wire is connected to the thin film heater through an end opening of the micro flow path and a sealant which seals the end opening of the micro flow path, as recited in amended independent claims 1, 22 and 24.

It is respectfully submitted, moreover, that Shioya et al, Jankowski et al and Gardner et al also do not disclose, teach or suggest the features of the present invention as recited in new independent claims 28, 29, 30 and 35.

And finally, it is respectfully submitted that the remaining prior art of record is no more pertinent to the claimed present invention than Shioya et al, Jankowski et al and Gardner et al.

In view of the foregoing, it is respectfully submitted that amended independent claims 1, 22 and 24, new independent claims 28, 29, 30 and 35, and claims 2-21, 23, 25-27, 31-34 and

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36-39 respectively depending therefrom, all clearly patentably distinguish over Shioya et al, Jankowski et al and Gardner et al, taken singly or in any combination, under 35 USC 102 as well as under 35 USC 103.

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Entry of this Amendment, allowance of the claims and the passing of this application to issue are respectfully solicited.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,

/Douglas Holtz/

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